What is claimed:

1. A polymersome comprising:

(i) a plurality of amphiphilic copolymers; and

(ii) at least one visible- or near infrared-emissive agent that is dispersed within the polymersome membrane.

2. The polymersome of claim 1 wherein the amphiphilic copolymer is an amphiphilic block copolymers comprising at least one hydrophilic polymer bonded to at least one hydrophobic polymer.

3. The polymersome of claim 2 where the emissive agent emits light in the 700-1100 nm spectral regime.

4. The polymersome of claim 2 where at least one emissive agent comprises a porphyrin moiety.

5. The polymersome of claim 4 wherein said emissive agent comprises at least two porphyrin moieties, said porphyrin moieties being linked by a hydrocarbon bridge comprising at least one unsaturated moiety.

6. The polymersome of claim 2 where at least one emissive agents comprises a porphycene, rubyrin, rosarin, hexaphyrin, sapphyrin, chlorophyl, chlorin, phthalocynine, porphyrazine, bacteriochlorophyl, pheophytin, texaphyrin macrocyclic-based component, or a metalated derivative thereof.

7. The polymersome of claim 2 where at least one emissive agent is a laser dye, fluorophore, lumophore, or phosphor.

8. The polymersome of claim 7 where at least one emissive agent is a laser dye that is p-terphenyl, sulforhodamine B, p-quaterphenyl, Rhodamine 101, curbostyryl 124, cresyl violet perchlorate, popop, DODC iodide, coumarin 120, sulforhodamine 101, coumarin 2, oxozine 4 perchlorate, coumarin 339, PCM, coumarin 1, oxazine 170 perchlorate, coumarin 138, nile blue A perchlorate, coumarin 106, oxatine 1 perchlorate, coumarin 102, pyridine 1,

coumarin 314T, styryl 7, coumarin 338, HIDC iodide, coumarin 151, PTPC iodide, coumarin 4, cryptocyanine, coumarin 314, DOTC iodide, coumarin 30, HITC iodide, coumarin 500, HITC perchlorate, coumarin 307, PTTC iodide, coumarin 334, DTTC perchlorate, coumarin 7, IR-144, coumarin 343, HDITC perchlorate, coumarin 337, IR-NO, coumarin 6, IR-132, coumarin 152, IR-125, coumarin 153, boron-dipyrromethere, HPTS, flourescein, rhodamine 110, 2, 7-dichlorofluorescein, rhodamine 65, and rhodamin 19 perchlorate, rhodamine b, where said laser dye is modified by addition of a hydrophobic substitutent, said laser dye being substantially within the polymersome membrane.

9. The polymersome of claim 2 where at least one emissive agent is a near infrared (NIR) emissive species that is a di- and tricarbocyanine dye, croconium dye, thienylenephenylenevinylene species substituted with at least one electron withdrawing substituent, where said emissive species is modified by addition of a hydrophobic substitutent, said laser dye being substantially within the polymersome membrane.

10. The polymersome of claim 2 where at least one of the emissive agent is an emissive conjugated compound comprising at least two covalently bound moieties; whereby upon exposing said compound to an energy source for a time and under conditions effective to cause said compound to emit light at a wavelength between 700-1100 nm, is of an intensity that is greater than a sum of light emitted by either of covalently bound moieties individually.

11. The polymersome of claim 2 where at least one of the emissive agent is an emissive conjugated compound comprising at least two covalently bound moieties; whereby upon exposing said compound to an energy source for a time and under conditions effective to cause said compound to emit light that at a wavelength between 700-1100 nm, and exhibits an integral emission oscillator strength that is greater than the emission oscillator strength manifest by either one of the said moieties individually.

12. A polymersome as in claim 10 or 11 where the covalently bound moieties that define the emissive species are linked by at least one carbon-carbon double bond, carbon-carbon triple bond, or a combination thereof.

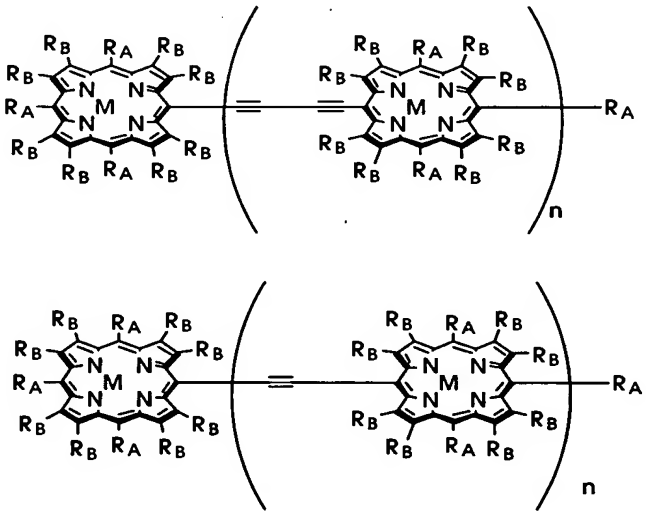
13. A polymersome as in claim 10 or 11 where the covalently bound moieties that define the emissive species are linked by ethynyl, ethenyl, allenyl, butadiynyl, polyvinyl, thiophenyl, furanyl, pyrrolyl, or p-diethylylarenyl linkers or by a conjugated heterocycle that bears diethynyl, di(polyynynyl), divinyl, di(polyvinvyl), or di(thiophenyl) substituents.

14. A polymersome as in claim 10 or 11 where the covalently bound moieties that define the emissive species are linked by at least one imine, phenylene, thiophene, or amide, ether, thioether, ester, ketone, sulfone, or carbodiimide group.

15. The polymersome of claim 2 where said polymersome is bioresorbable

16. The polymersome of claim 4 wherein the said phorphinato imaging agent is an ethynyl- or butadiynyl-bridged multi(porphyrin) compound that features a β-to-β, meso-to-β, or meso-to-meso linkage topology, and the porphinato imaging agent being capable of emitting in the 600-to-1100 nm spectral regime.

17. The polymersome of claim 16 wherein the porphyrin-based imaging agent is of the formula:



where M is a metal or H_2, where H_2 denotes the free ligand form of the macrocycle;

R_A and R_B are each, independently, H, C_1-C_{20} alkyl or C_1-C_{20} heteroalkyl, C_6-C_{20} aryl or heteroaryl, $C(R_C)=C(R_D)(R_E)$, $C\equiv C$ (R_D), or a chemical functional group comprising

a peptide, nucleoside or saccharide where R_C, R_D and R_E are each independently, H, F, Cl, Br, I, C_1-C_{20} alkyl or C_4-C_{20} heteroalkyl, aryl or heteroaryl, C_2-C_{20} alkenyl or heteroalkenyl, alkynyl or C_2-C_{20} heteroalkynyl, trialkylsilyl, or porphyrinato;

and n is an integer from 1 to 10.

18. The polymersome of claim 17 where n is an integer from 1 to 8.

19. The polymersome of claim 17 where M of the porphyrin-based imaging agent is zinc, magnesium, platinum, palladium, or H_2, where H_2 denotes the free ligand form of the macrocycle.

20. The polymersome of claim 17 where said polymersome porphyrin-based imaging agent is emissive.

21. The polymersome of 17, wherein the said multi(porphyrin) imaging agent comprises a meso-to-meso ethyne- or butadiyne-bridged linkage topology, said imaging agent being capable of emitting in the 600-to-1100 nm spectral regime.

22. The polymersome of claim 2 wherein said polymersome comprises one amphiphilic block co-polymer.

23. The polymersome of claim 2 wherein said amphiphilic block co-polymer comprises one hydrophobic polymer and one hydrophilic polymer.

24. The polymersome of claim 2 wherein said amphiphilic block co-polymer is a triblock polymer comprising terminal hydrophilic polymers and a hydrophobic internal polymer.

25. The polymersome of claim 2 wherein said amphiphilic block co-polymer is a tetrablock polymer comprising two hydrophilic polymer blocks and two hydrophobic polymer blocks.

26. The polymersome of claim 25 comprising terminal hydrophilic polymer blocks and internal hydrophobic polymer blocks.

27. The polymersome of claim 2 wherein said amphiphilic block co-polymer is a pentablock polymer comprising two hydrophilic polymer blocks and three hydrophobic polymer blocks.

28. The polymersome of claim 2 wherein said amphiphilic block co-polymer is a pentablock polymer comprising three hydrophilic polymer blocks and two hydrophobic polymer blocks.

29. The polymersome of claim 2 wherein said amphiphilic block co-polymer is a pentablock polymer comprising four hydrophilic polymer blocks and one hydrophobic polymer block.

30. The polymersome of claim 2 wherein said amphiphilic block co-polymer comprises at least six block, at least two of which are hydrophilic polymer blocks.

31. The polymersome of claim 2 further comprising at least one lipid, phospholipid, steroid, cholesterol, single chain alcohol, peptide, or surfactant.

32. The polymersome of claim 2 wherein the amphiphilic co-polymer is made by attaching two strands comprising different monomers.

33. The polymersome of claim 2 wherein the amphiphilic co-polymer comprises polymers made by free radical initiation, anionic polymerization, peptide synthesis, or ribosomal synthesis using transfer RNA.

34. The polymersome of claim 2 wherein the hydrophilic polymer comprises poly(ethylene oxide) or poly(ethylene glycol).

35. The polymersome of claim 2 wherein the hydrophilic polymer is soluble in water.

36. The polymersome of claim 2 wherein the hydrophilic polymer comprises polymerized units selected from ionically polymerizable polar monomers.

37. The polymersome of claim 36 wherein the ionically polymerizable polar monomers comprise an alkyl oxide monomer.

38. The polymersome of claim 37 wherein the alkyl oxide monomer is ethylene oxide, propylene oxide, or any combination thereof.

39. The polymersome of claim 2 wherein the hydrophilic polymer comprises poly(ethylene oxide).

40. The polymersome of claim 2 wherein the volume fraction of the hydrophilic polymers in the plurality of amphiphilic block copolymers is less than or equal to 0.40.

41. The polymersome of claim 2 wherein the hydrophobic polymer comprises polyethylethylene, poly(butadiene), poly(β-benzyl-L-aspartate), poly(lactic acid), poly(propylene oxide), poly(ε-caprolactam), oligo-methacrylate, or polystyrene.

42. The polymersome of claim 2 wherein the hydrophobic polymer comprises polyethylethylene or poly(butadiene).

43. The polymersome of claim 2 wherein the hydrophobic polymer comprises polymerized units selected from unsaturated monomers.

44. The polymersome of claim 43 wherein the unsaturated monomers are hydrocarbons.

45. The polymersome of claim 2 where said polymersome contains a hydrophobic polycaprolactone, polylacticde, polyglycolide, or polymethylene carbonate polymer block used in combination with a corresponding polyethyleneoxide polymer block.

46. The polymersome of claim 1 wherein the amphiphilic block copolymer is poly(ethylene oxide)-polyethylethylene, poly(ethylene oxide)-poly(butadiene), poly(ethylene oxide)-poly(ε-caprolactone) or poly(ethylene oxide)-poly(lactic acid).

47. The polymersome of claim 2 additionally comprising a therapeutic agent.

48. The polymersome of claim 2 additionally comprising one or more distinct emissive species.

49. The composition of claim 2 additionally comprising at least one of a secondary emitter, a cytotoxic agent, a magnetic resonance imaging (MRI) agent, positron emission tomography (PET) agent, radiological imaging agent or a photodynamic therapy (PDT) agent.

50. The composition of claim 2 additionally comprising at least one of a secondary emitter, a cytotoxic agent, a magnetic resonance imaging (MRI) agent, positron emission tomography (PET) agent, photodynamic therapy (PDT) agent, radiological imaging agent, ferromagnetic agent, or ferrimagnetic agent, where said emitter or agent is compartmentalized within the aqueous polymersome interior.

51. The composition of claim 2 additionally comprising a protein, peptide, saccharide, nucleoside, inorganic compound, biological entity such as a virus, organelle, bacterium, or cellular component, or organic compound compartmentalized within the aqueous polymersome interior.

52. A polymersome comprising:

(i) a plurality of amphiphilic copolymers;

(ii) at least one visible- or near infrared-emissive agent that is segregated within the polymersome membrane; and

(iii) at least one targeting moiety associated with a surface of the polymersome.

53. The polymersome of claim 52 wherein the amphiphilic copolymer is an amphiphilic block copolymers comprising at least one hydrophilic polymer bonded to at least one hydrophobic polymer.

54. The polymersome of claim 53 where the emissive agent emits light in the 700-1100 nm spectral regime.

55. The polymersome of claim 53 where at least one of the imaging agents has a porphyrin-based component.

56. The polymersome of claim 53 where at least one emissive agent is a porphycene, rubyrin, rosarin, hexaphyrin, sapphyrin, chlorophyl, chlorin, phthalocynine, porphyrazine, bacteriochlorophyl, pheophytin, or texaphyrin-based macrocyclic-based component, or a metalated derivative thereof.

57. The polymersome of claim 53 where at least one emissive agent is a laser dye, fluorophore, lumophore, or phosphor.

58. The polymersome of claim 57 where at least one emissive agent is a laser dye that is p-terphenyl, sulforhodamine B, p-quaterphenyl, Rhodamine 101, curbostyryl 124, cresyl violet perchlorate, popop, DODC iodide, coumarin 120, sulforhodamine 101, coumarin 2, oxozine 4 perchlorate, coumarin 339, PCM, coumarin 1, oxazine 170 perchlorate, coumarin 138, nile blue A perchlorate, coumarin 106, oxatine 1 perchlorate, coumarin 102, pyridine 1, coumarin 314T, styryl 7, coumarin 338, HIDC iodide, coumarin 151, PTPC iodide, coumarin 4, cryptocyanine, coumarin 314, DOTC iodide, coumarin 30, HITC iodide, coumarin 500, HITC perchlorate, coumarin 307, PTTC iodide, coumarin 334, DTTC perchlorate, coumarin 7, IR-144, coumarin 343, HDITC perchlorate, coumarin 337, IR-NO, coumarin 6, IR-132, coumarin 152, IR-125, coumarin 153, boron-dipyrromethere, HPTS, flourescein, rhodamine 110, 2, 7-dichlorofluorescein, rhodamine 65, and rhodamin 19 perchlorate, rhodamine b, where said laser dye is modified by addition of a hydrophobic substitutent, said laser dye being substantially within the polymersome membrane.

59. The polymersome of claim 53 where at least one of the emissive agent is a NIR emissive species that is indocyanine green, di- and tricarbocyanine dyes, croconium dyes, thienylenephenylenevinylene species substituted with electron withdrawing substituents, where such an emissive material is modified by addition of a hydrophobic substitutent, said laser dye being substantially within the polymersome membrane.

60. The polymersome of claim 53 where at least one of the emissive agent is an emissive conjugated compound comprising at least two covalently bound moieties; whereby

upon exposing said compound to an energy source for a time and under conditions effective to cause said compound to emit light at a wavelength between 700-1100 nm, is of an intensity that is greater than a sum of light emitted by either of covalently bound moieties individually.

61. The polymersome of claim 53 where at least one emissive agent is a conjugated compound comprising at least two covalently bound moieties; whereby upon exposing said compound to an energy source for a time and under conditions effective to cause said compound to emit light that at a wavelength between 700-1100 nm, and exhibits an integral emission oscillator strength that is greater than the emission oscillator strength manifest by one of the said moieties individually.

62. A polymersome as in claim 60 or 61 where the covalently bound moieties that define the emissive species are linked by at least one carbon-carbon double bond, carbon-carbon triple bond, or a combination thereof.

63. A polymersome as in claim 60 or 61 where the covalently bound moieties that define the emissive species are linked by ethynyl, ethenyl, allenyl, butadiynyl, polyvinyl, thiophenyl, furanyl, pyrrolyl, p-diethylylarenyl or any conjugated heterocycle that bears diethynyl, di(polyynynyl), divinyl, di(polyvinvyl), or di(thiophenyl) substituents.

64. A polymersome as in claim 60 or 61 where the covalently bound moieties that define the emissive species are linked by at least one imine, phenylene, thiophene, or amide, ether, thioether, ester, ketone, sulfone, or carbodiimide group.

65. The polymersome of claim 53 where said polymersome is bioresorbable.

66. The polymersome of claim 65 where said polymersome contains a hydrophobic polycaprolactone, polylacticde, polyglycolide, or polymethylene carbonate polymer block used in combination with a corresponding polyethyleneoxide polymer block.

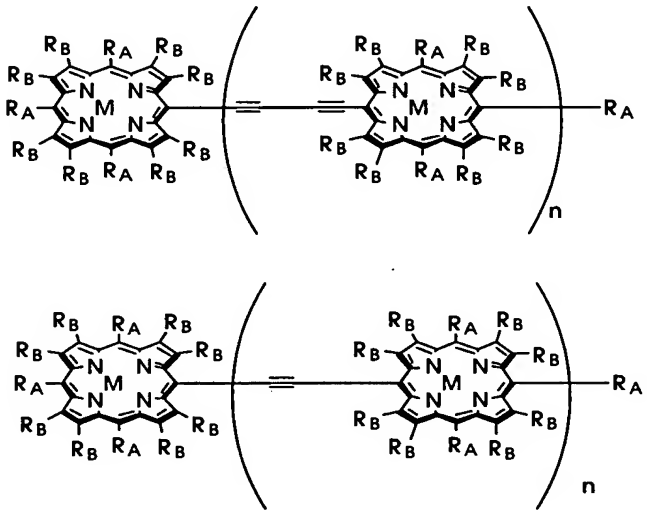
67. A polymersome as in claim 53 where said polymersome contains block polymer components approved by the United States Food and Drug Administration (FDA) for use *in vivo*.

68. The polymersome of claim 53 wherein the targeting moiety specifically binds with a biological situs.

69. The polymersome of claim 53 wherein the targeting moiety specifically binds with a biological situs under physiological conditions.

70. The polymersome of claims 55 wherein the said phorphinato imaging agent is an ethynyl- or butadiynyl-bridged multi(porphyrin) compound that features a β-to-β, meso-to-β, or meso-to-meso linkage topology, and the porphinato imaging agent being capable of emitting in the 600-to-1100 nm spectral regime.

71. The polymersome of claim 70 wherein the porphyrin-based imaging agent is of the formula:



where M is a metal or H_2, where H_2 denotes the free ligand form of the macrocycle;

R_A and R_B are each, independently, H, alkyl or C_1-C_{20} heteroalkyl, C_6-C_{20} aryl or heteroaryl, $C(R_C)=C(R_D)(R_E)$, $C\equiv C(R_D)$, or a chemical functional group comprising a peptide, nucleoside or saccharide where R_C, R_D and R_E are each independently, H, F, Cl, Br, I, C_1-C_{20} alkyl or C_4-C_{20} heteroalkyl, aryl or heteroaryl, C_2-C_{20} alkenyl or heteroalkenyl, alkynyl or C_2-C_{20} heteroalkynyl, trialkylsilyl, or porphyrinato;

and n is an integer from 1 to 10.

72. The polymersome of claim 71 where n is an integer from 1 to 8.

73. The polymersome of claim 72 where M of the porphyrin-based imaging agent is zinc, magnesium, platinum, palladium, or H_2, where H_2 denotes the free ligand form of the macrocycle.

74. The polymersome of claim 55 where said polymersome porphyrin-based imaging agent is emissive.

75. The polymersome of 55, wherein the said multi(porphyrin) imaging agent comprises a meso-to-meso ethyne- or butadiyne-bridged linkage topology, said imaging agent being capable of emitting in the 600-to-1100 nm spectral regime.

76. The polymersome of claim 53 wherein the targeting moiety comprises an antibody, antibody fragment, or substance specific for a given receptor binding site.

77. The polymersome of claim 56 wherein the receptor binding site, or targeting moiety comprises a receptor-specific peptide, carbohydrate, protein, lipid, nucleoside, peptide nucleic acid, organic compound, or combinations thereof.

78. The polymersome of claim 53 wherein said polymersome comprises one amphiphilic block co-polymer.

79. The polymersome of claim 53 wherein said amphiphilic block co-polymer comprises one hydrophobic polymer and one hydrophilic polymer.

80. The polymersome of claim 53 wherein said amphiphilic block co-polymer is a triblock polymer comprising terminal hydrophilic polymers and a hydrophobic internal polymer.

81. The polymersome of claim 53 wherein said amphiphilic block co-polymer is a tetrablock polymer comprising two hydrophilic polymer blocks and two hydrophobic polymer blocks.

82. The polymersome of claim 81 comprising terminal hydrophilic polymer blocks and internal hydrophobic polymer blocks.

83. The polymersome of claim 53 wherein said amphiphilic block co-polymer is a pentablock polymer comprising two hydrophilic polymer blocks and three hydrophobic polymer blocks.

84. The polymersome of claim 53 wherein said amphiphilic block co-polymer is a pentablock polymer comprising three hydrophilic polymer blocks and two hydrophobic polymer blocks.

85. The polymersome of claim 53 wherein said amphiphilic block co-polymer is a pentablock polymer comprising four hydrophilic polymer blocks and one hydrophobic polymer block.

86. The polymersome of claim 53 wherein said amphiphilic block co-polymer comprises at least six block, at least two of which are hydrophilic polymer blocks.

87. The polymersome of claim 53 further comprising at least one lipid, phospholipid, steroid, cholesterol, single chain alcohol, peptide, or surfactant.

88. The polymersome of claim 53 wherein the amphiphilic co-polymer is made by attaching two strands comprising different monomers.

89. The polymersome of claim 53 wherein the amphiphilic co-polymer comprises polymers made by free radical initiation, anionic polymerization, peptide synthesis, or ribosomal synthesis using transfer RNA.

90. The polymersome of claim 53 wherein the hydrophilic polymer comprises poly(ethylene oxide) or poly(ethylene glycol).

91. The polymersome of claim 53 wherein the hydrophilic polymer is soluble in water.

92. The polymersome of claim 53 wherein the hydrophilic polymer comprises polymerized units selected from ionically polymerizable polar monomers.

93. The polymersome of claim 92 wherein the ionically polymerizable polar monomers comprise an alkyl oxide monomer.

94. The polymersome of claim 93 wherein the alkyl oxide monomer is ethylene oxide, propylene oxide, or any combination thereof.

95. The polymersome of claim 90 wherein the hydrophilic polymer comprises poly(ethylene oxide).

96. The polymersome of claim 95 wherein the volume fraction of the hydrophilic polymers in the plurality of amphiphilic block copolymers is less than or equal to 0.40.

97. The polymersome of claim 53 wherein the hydrophobic polymer comprises polyethylethylene, poly(butadiene), poly(β-benzyl-L-aspartate), poly(lactic acid), poly(propylene oxide), poly(ε-caprolactam), oligo-methacrylate, or polystyrene.

98. The polymersome of claim 97 wherein the hydrophobic polymer comprises polyethylethylene or poly(butadiene).

99. The polymersome of claim 97 wherein the hydrophobic polymer comprises polymerized units selected from ethylenically unsaturated monomers.

100. The polymersome of claim 98 wherein the ethylenically unsaturated monomers are hydrocarbons.

101. The polymersome of claim 53 wherein the amphiphilic block copolymer is poly(ethylene oxide)-polyethylethylene, poly(ethylene oxide)-poly(butadiene), poly(ethylene oxide)-poly(ε-caprolactone) or poly(ethylene oxide)-poly(lactic acid).

102. The composition of claim 53 additionally comprising a therapeutic agent.

103. The composition of claim 53 additionally comprising one or more distinct emissive species.

104. The composition of claim 53 additionally comprising at least one of a secondary emitter, a cytotoxic agent, a magnetic resonance imaging (MRI) agent, positron emission tomography (PET) agent, radiological imaging agent or a photodynamic therapy (PDT) agent.

105. The composition of claim 53 additionally comprising at least one of a secondary emitter, a cytotoxic agent, a magnetic resonance imaging (MRI) agent, positron emission tomography (PET) agent, photodynamic therapy (PDT) agent, radiological imaging agent, ferromagnetic agent, or ferrimagnetic agent, where said emitter or agent is compartmentalized within the aqueous polymersome interior.

106. The composition of claim 53 additionally comprising a protein, peptide, saccharide, nucleoside, inorganic compound, biological entity such as a virus, organelle, bacterium, or cellular component, or organic compound compartmentalized within the aqueous polymersome interior.

107. A method of delivering an agent to a biological situs in a tissue or organism comprising administering to the tissue or organism a polymersome having the agent and comprising (a) a plurality of amphiphilic copolymers; (b) at least one visible- or near infrared-emissive agent that is dispersed within the polymersome membrane; and (c) at least one targeting moiety associated with a surface of the polymersome.

108. The method of claim 107 wherein the amphiphilic copolymer is an amphiphilic block copolymers where each of the amphiphilic block copolymers comprises at least one hydrophilic polymer bonded to at least one hydrophobic polymer.

109. The method of claim 108 wherein the emissive agent is an phorphinato imaging agent.

110. The method of claim 108 further comprising determining when a selected amount of the polymersome is at the situs; and liberating at least a portion of the agent.

111. The method of claim 109 wherein said phorphinato imaging agent is an ethynyl- or butadiynyl-bridged multi(porphyrin) compound that features a β-to-β, meso-to-β, or meso-to-meso linkage topology, and the porphinato imaging agent being capable of emitting in the 600-to-1100 nm spectral regime.

112. The method of claim 109 wherein said emissive agent comprises at least two porphyrin moieties, said porphyrin moieties being linked by a hydrocarbon bridge comprising at least one unsaturated moiety.

113. The method of claim 108 where at least one emissive agents comprises a porphycene, rubyrin, rosarin, hexaphyrin, sapphyrin, chlorophyl, chlorin, phthalocynine, porphyrazine, bacteriochlorophyl, pheophytin, texaphyrin macrocyclic-based component, or a metalated derivative thereof.

114. The method of claim 108 where at least one emissive agent is a laser dye, fluorophore, lumophore, or phosphor.

115. The method of claim 114 where at least one emissive agent is a laser dye that is p-terphenyl, sulforhodamine B, p-quaterphenyl, Rhodamine 101, curbostyryl 124, cresyl violet perchlorate, popop, DODC iodide, coumarin 120, sulforhodamine 101, coumarin 2, oxozine 4 perchlorate, coumarin 339, PCM, coumarin 1, oxazine 170 perchlorate, coumarin 138, nile blue A perchlorate, coumarin 106, oxatine 1 perchlorate, coumarin 102, pyridine 1, coumarin 314T, styryl 7, coumarin 338, HIDC iodide, coumarin 151, PTPC iodide, coumarin 4, cryptocyanine, coumarin 314, DOTC iodide, coumarin 30, HITC iodide, coumarin 500, HITC perchlorate, coumarin 307, PTTC iodide, coumarin 334, DTTC perchlorate, coumarin 7, IR-144, coumarin 343, HDITC perchlorate, coumarin 337, IR-NO, coumarin 6, IR-132, coumarin 152, IR-125, coumarin 153, boron-dipyrromethere, HPTS,

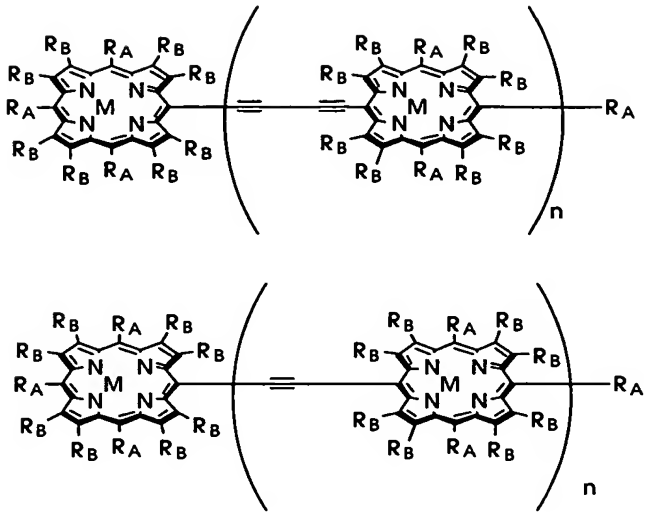
flourescein, rhodamine 110, 2, 7-dichlorofluorescein, rhodamine 65, and rhodamin 19 perchlorate, rhodamine b, where said laser dye is modified by addition of a hydrophobic substitutent, said laser dye being substantially within the polymersome membrane.

116. The method of claim 108 where at least one emissive agent is a near infrared (NIR) emissive species that is a di- and tricarbocyanine dye, croconium dye, thienylenephenylenevinylene species substituted with at least one electron withdrawing substituent, where said emissive species is modified by addition of a hydrophobic substitutent, said laser dye being substantially within the polymersome membrane.

117. The method of claim 108 where at least one of the emissive agent is an emissive conjugated compound comprising at least two covalently bound moieties; whereby upon exposing said compound to an energy source for a time and under conditions effective to cause said compound to emit light at a wavelength between 700-1100 nm, is of an intensity that is greater than a sum of light emitted by either of covalently bound moieties individually.

118. The method of claim 108 where at least one of the emissive agent is an emissive conjugated compound comprising at least two covalently bound moieties; whereby upon exposing said compound to an energy source for a time and under conditions effective to cause said compound to emit light that at a wavelength between 700-1100 nm, and exhibits an integral emission oscillator strength that is greater than the emission oscillator strength manifest by either one of the said moieties individually.

119. The method of claim 108 wherein the phorphinato imaging agent is of the formula:



where M is a metal or H_2, where H_2 denotes the free ligand form of the macrocycle;

R_A and R_B are each, independently, H, alkyl or C_1-C_{20} heteroalkyl, C_6-C_{20} aryl or heteroaryl, $C(R_C)=C(R_D)(R_E)$, $C\equiv C(R_D)$, or a chemical functional group comprising a peptide, nucleoside or saccharide where R_C, R_D and R_E are each independently, H, F, Cl, Br, I, C_1-C_{20} alkyl or C_4-C_{20} heteroalkyl, aryl or heteroaryl, C_2-C_{20} alkenyl or heteroalkenyl, alkynyl or C_2-C_{20} heteroalkynyl, trialkylsilyl, or porphyrinato;

and n is an integer from 1 to 10.

120. The method of claim 111 wherein the targeting moiety comprises an antibody, antibody fragment, or substance specific for a given receptor binding site.

121. The method of claim 120 wherein the receptor binding site, or substance, comprises a receptor-specific peptide, carbohydrate, protein, lipid, nucleoside, peptide nucleic acid, or combinations thereof.

122. The method of claim 111 wherein the hydrophilic polymer comprises poly(ethylene oxide) or poly(ethylene glycol).

123. The method of claim 122 wherein the hydrophilic polymer comprises poly(ethylene oxide).

124. The method of claim 123 wherein the volume fraction of hydrophilic polymers in the plurality of amphiphilic block copolymers is less than or equal to 0.40.

125. The method of claim 122 wherein the hydrophobic polymer comprises polyethylethylene, poly(1,2-butadiene), poly(β-benzyl-L-aspartate), poly(lactic acid), poly(propylene oxide), poly(ε-caprolactam), oligo-methacrylate, or polystyrene.

126. The method of claim 125 wherein the hydrophobic polymer comprises polyethylethylene or poly(1,2-butadiene).

127. The method of claim 108 wherein the amphiphilic block copolymer comprises poly(ethylene oxide)-polyethylethylene, poly(ethylene oxide)-poly(butadiene), poly(ethylene oxide)-poly(ε-caprolactone) or poly(ethylene oxide)-poly(lactic acid).

128. The method of claim 110 wherein the therapeutic agent is liberated using ultrasonic energy to disrupt the structure of the polymersome.

129. The method of claim 110 wherein the therapeutic agent is liberated using light energy to disrupt the structure of the polymersome.

130. The method of claim 110 wherein the therapeutic agent is liberated using enzymatic degradation of polymeric components of the polymersome.

131. A method of ascertaining the presence or absence of a disease state in an organism or tissue comprising:

administering a polymersome to a patient, the polymersome comprising (a) a plurality of amphiphilic copolymers; (b) at least one visible- or near infrared-emissive agent that is dispersed within the polymersome membrane; and (c) at least one targeting moiety associated with a surface of the polymersome;

providing an instrument optically coupled to a light source, a light detector, or both, and

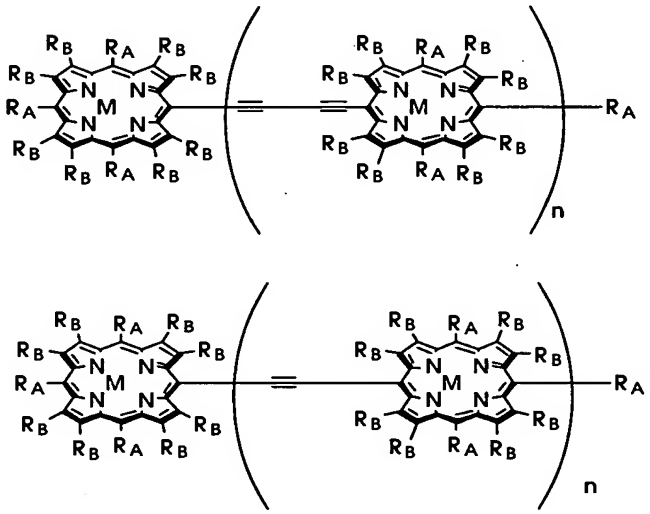
operating the instrument to monitor the amount or distribution of the phorphinato imaging agent within the organism or tissue.

132. The method of claim 131 wherein the amphiphilic copolymer is an amphiphilic block copolymers where each of the amphiphilic block copolymers comprises at least one hydrophilic polymer bonded to at least one hydrophobic polymer.

133. The method of claim 132 wherein the emissive agent is an phorphinato imaging agent.

134. The method of claim 133 wherein the phorphinato imaging agent is an ethynyl- or butadiynyl-bridged multi(porphyrin) compound that features a β-to-β, meso-to-β, or meso-to-meso linkage topology, and the porphinato imaging agent being capable of emitting in the 600-to-1100 nm spectral regime.

135. The method of claim 134 wherein the phorphinato imaging agent is of the formula:



where M is a metal or H_2, where H_2 denotes the free ligand form of the macrocycle;

R_A and R_B are each, independently, H, alkyl or C_1-C_{20} heteroalkyl, C_6-C_{20} aryl or heteroaryl, $C(R_C)=C(R_D)(R_E)$, $C\equiv C$ (R_D), or a chemical functional group comprising a peptide, nucleoside or saccharide where R_C, R_D and R_E are each independently, H, F, Cl, Br, I, C_1-C_{20} alkyl or C_4-C_{20} heteroalkyl, aryl or heteroaryl, C_2-C_{20} alkenyl or heteroalkenyl, alkynyl or C_2-C_{20} heteroalkynyl, trialkylsilyl, or porphyrinato;

and n is an integer from 1 to 10.

136. The method of claim 134 wherein said emissive agent comprises at least two porphyrin moieties, said porphyrin moieties being linked by a hydrocarbon bridge comprising at least one unsaturated moiety.

137. The method of claim 132 where at least one emissive agents comprises a porphycene, rubyrin, rosarin, hexaphyrin, sapphyrin, chlorophyl, chlorin, phthalocynine, porphyrazine, bacteriochlorophyl, pheophytin, texaphyrin macrocyclic-based component, or a metalated derivative thereof.

138. The method of claim 132 where at least one emissive agent is a laser dye, fluorophore, lumophore, or phosphor.

139. The method of claim 138 where at least one emissive agent is a laser dye that is p-terphenyl, sulforhodamine B, p-quaterphenyl, Rhodamine 101, curbostyryl 124, cresyl violet perchlorate, popop, DODC iodide, coumarin 120, sulforhodamine 101, coumarin 2, oxozine 4 perchlorate, coumarin 339, PCM, coumarin 1, oxazine 170 perchlorate, coumarin 138, nile blue A perchlorate, coumarin 106, oxatine 1 perchlorate, coumarin 102, pyridine 1, coumarin 314T, styryl 7, coumarin 338, HIDC iodide, coumarin 151, PTPC iodide, coumarin 4, cryptocyanine, coumarin 314, DOTC iodide, coumarin 30, HITC iodide, coumarin 500, HITC perchlorate, coumarin 307, PTTC iodide, coumarin 334, DTTC perchlorate, coumarin 7, IR-144, coumarin 343, HDITC perchlorate, coumarin 337, IR-NO, coumarin 6, IR-132, coumarin 152, IR-125, coumarin 153, boron-dipyrromethere, HPTS, flourescein, rhodamine 110, 2, 7-dichlorofluorescein, rhodamine 65, and rhodamin 19 perchlorate, rhodamine b, where said laser dye is modified by addition of a hydrophobic substitutent, said laser dye being substantially within the polymersome membrane.

140. The method of claim 132 where at least one emissive agent is a near infrared (NIR) emissive species that is a di- and tricarbocyanine dye, croconium dye, thienylenephenylenevinylene species substituted with at least one electron withdrawing substituent, where said emissive species is modified by addition of a hydrophobic substitutent, said laser dye being substantially within the polymersome membrane.

141. The method of claim 132 where at least one of the emissive agent is an emissive conjugated compound comprising at least two covalently bound moieties; whereby upon

exposing said compound to an energy source for a time and under conditions effective to cause said compound to emit light at a wavelength between 700-1100 nm, is of an intensity that is greater than a sum of light emitted by either of covalently bound moieties individually.

142. The method of claim 132 where at least one of the emissive agent is an emissive conjugated compound comprising at least two covalently bound moieties; whereby upon exposing said compound to an energy source for a time and under conditions effective to cause said compound to emit light that at a wavelength between 700-1100 nm, and exhibits an integral emission oscillator strength that is greater than the emission oscillator strength manifest by either one of the said moieties individually.

143. The method of claim 132 wherein the targeting moiety comprises an antibody, antibody fragment, or substance specific for a given receptor binding site.

144. The method of claim 143 wherein the receptor binding site or substance comprises a receptor-specific peptide, carbohydrate, protein, lipid, nucleoside, peptide nucleic acid, or combinations thereof.

145. The method of claim 134 wherein the hydrophilic polymer comprises poly(ethylene oxide) or poly(ethylene glycol).

146. The method of claim 143 wherein the hydrophilic polymer comprises poly(ethylene oxide).

147. The method of claim 146 wherein the volume fraction of hydrophilic polymers in the plurality of amphiphilic block copolymers is less than or equal to 0.40.

148. The method of claim 145 wherein the hydrophobic polymer comprises polyethylethylene, poly(1,2-butadiene), poly(β-benzyl-L-aspartate), poly(lactic acid), poly(propylene oxide), poly(ε-caprolactam), oligo-methacrylate, or polystyrene.

149. The method of claim 148 wherein the hydrophobic polymer comprises polyethylethylene or poly(1,2-butadiene).

150. The method of claim 132 wherein the amphiphilic block copolymer is poly(ethylene oxide)-polyethylethylene, poly(ethylene oxide)-poly(butadiene), poly(ethylene oxide)-poly(ε-caprolactone) or poly(ethylene oxide)-poly(lactic acid).

151. The method of claim 132 additionally comprising at least one of a secondary emitter, a cytotoxic agent, a magnetic resonance imaging (MRI) agent, positron emission tomography (PET) agent, radiological imaging agent, radiological imaging agent or a photodynamic therapy (PDT) agent.

152. The method of claim 133 additionally comprising at least one of a secondary emitter, a cytotoxic agent, a magnetic resonance imaging (MRI) agent, positron emission tomography (PET) agent, radiological imaging agent or a photodynamic therapy (PDT) agent. where said emitter or agent is compartmentalized within the aqueous polymersome interior.

153. An *in vivo* method of diagnostics or imaging comprising:

contacting a polymersome with tissue within an organism, the polymersome comprising (a) a plurality of amphiphilic copolymers; (b) at least one visible- or near infrared-emissive agent that is dispersed within the polymersome membrane; and (c) at least one targeting moiety associated with a surface of the polymersome;

providing an instrument optically coupled to a light source, a light detector, or both, and

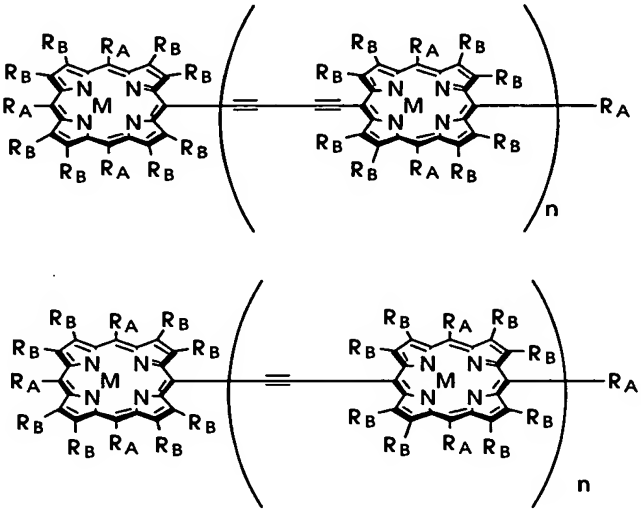
using the instrument to monitor the amount of the polymersome at a situs within the tissue.

154. The method of claim 153 wherein the amphiphilic copolymer is an amphiphilic block copolymers where each of the amphiphilic block copolymers comprises at least one hydrophilic polymer bonded to at least one hydrophobic polymer.

155. The method of claim 154 wherein the emissive agent is an phorphinato imaging agent.

156. The method of claim 155 wherein the said imaging agent is an ethynyl- or butadiynyl-bridged multi(porphyrin) compound that features a β-to-β, meso-to-β, or meso-to-meso linkage topology, and the porphinato imaging agent being capable of emitting in the 600-to-1100 nm spectral regime.

157. The method of claim 156 wherein the phorphinato imaging agent is of the formula:



where M is a metal or H_2, where H_2 denotes the free ligand form of the macrocycle;

R_A and R_B are each, independently, H, alkyl or C_1-C_{20} heteroalkyl, C_6-C_{20} aryl or heteroaryl, $C(R_C)=C(R_D)(R_E)$, $C\equiv C$ (R_D), or a chemical functional group comprising a peptide, nucleoside or saccharide where R_C, R_D and R_E are each independently, H, F, Cl, Br, I, C_1-C_{20} alkyl or C_4-C_{20} heteroalkyl, aryl or heteroaryl, C_2-C_{20} alkenyl or heteroalkenyl, alkynyl or C_2-C_{20} heteroalkynyl, trialkylsilyl, or porphyrinato;

and n is an integer from 1 to 10.

158. The method of claim 155 wherein the targeting moiety comprises an antibody, antibody fragment, or substance specific for a given receptor binding site.

159. The method of claim 158 wherein the receptor binding site or substance comprises a receptor-specific peptide, carbohydrate, protein, lipid, nucleoside, peptide nucleic acid, or combinations thereof.

160. The method of claim 156 wherein the hydrophilic polymer comprises poly(ethylene oxide) or poly(ethylene glycol).

161. The method of claim 160 wherein the hydrophilic polymer comprises poly(ethylene oxide).

162. The method of claim 161 wherein the volume fraction of hydrophilic polymers in the plurality of amphiphilic block copolymers is less than or equal to 0.40.

163. The method of claim 160 wherein the hydrophobic polymer comprises polyethylethylene, poly(1,2-butadiene), poly(β-benzyl-L-aspartate), poly(lactic acid), poly(propylene oxide), poly(ε-caprolactam), oligo-methacrylate, or polystyrene.

164. The method of claim 163 wherein the hydrophobic polymer comprises polyethylethylene or poly(1,2-butadiene).

165. The method of claim 155 wherein the amphiphilic block copolymer is poly(ethylene oxide)-polyethylethylene, poly(ethylene oxide)-poly(butadiene), poly(ethylene oxide)-poly(ε-caprolactone) or poly(ethylene oxide)-poly(lactic acid).

166. An *in vitro* diagnostic method comprising:

contacting a polymersome with isolated cells, mixtures of cells, or specific cell lines, with the polymersome comprising (a) a plurality of amphiphilic copolymers; (b) at least one visible- or near infrared-emissive agent that is dispersed within the polymersome membrane; and (c) at least one targeting moiety associated with a surface of the polymersome;

providing an instrument optically coupled to a light source, a light detector, or both, and

using the instrument to monitor cell-surface-to-polymersome binding.

167. The method of claim 166 wherein the amphiphilic copolymer is an amphiphilic block copolymers where each of the amphiphilic block copolymers comprises at least one hydrophilic polymer bonded to at least one hydrophobic polymer.

168. The method of claim 167 wherein the targeting moiety targets cancer cells allowing the method to be utilized for real-time cancer detection.

169. The method of claim 167 wherein more than one emissive agent is used, each emissive agent having a different emissive signature, and further comprising the step of creating a panoply of unique histological markers for multiple distinct biomarkers for in vitro diagnosis.

170. A method for histological labeling, molecular classification of cell surface markers, or guiding the development of novel directed therapeutic strategies, comprising

contacting a polymersome with isolated cells, mixtures of cells, or specific cell lines, with the polymersome comprising (a) a plurality of amphiphilic copolymers; (b) at least one visible- or near infrared-emissive agent that is dispersed within the polymersome membrane; and (c) at least one targeting moiety associated with a surface of the polymersome;

providing an instrument optically coupled to a light source, a light detector, or both, and

using the instrument to monitor cell-surface-to-polymersome binding.

171. The method of claim 170 wherein the amphiphilic copolymer is an amphiphilic block copolymers where each of the amphiphilic block copolymers comprises at least one hydrophilic polymer bonded to at least one hydrophobic polymer.

172. A method of modulating the emission properties of a visible- or near infrared-emissive agent comprising at least two covalently bound moieties, said emissive agent being within a polymeric material, wherein at least one of the bound moieties comprises an ancillary substituent, the size and chemical constitution of said substituent being selected to provide said modulation.

173. The method of claim 172 wherein said modulation is of the steady state emission wavelength.

174. The method of claim 172 wherein said modulation is of the time-dependent emission dynamics of said emissive conjugated compound.

175. The method of claim 172, wherein the said emissive agent is a multi(porphyrin) imaging agent comprises a meso-to-meso ethyne- or butadiyne-bridged linkage topology, said imaging agent being capable of emitting in the 600-to-1100 nm spectral regime.

176. The method of claim 172 wherein the said emissive agent cimprises a porphycene, rubyrin, rosarin, hexaphyrin, sapphyrin, chlorophyl, chlorin, phthalocynine, porphyrazine, bacteriochlorophyl, pheophytin, texaphyrin macrocyclic-based component, or a metalated derivative thereof.

177. The method of claim 172 wherein the said emissive agent comprises a laser dye, fluorophore, lumophore, or phosphor.

178. The method of claim 172 wherein the said emissive agent comprises at least two covalently bound moieties; whereby upon exposing said agent to an energy source for a time and under conditions effective to cause said compound to emit light at a wavelength between 700-1100 nm, is of an intensity that is greater than a sum of light emitted by either of covalently bound moieties individually.

179. The method of claim 172 wherein the said emissive agent comprises at least two covalently bound moieties; whereby upon exposing said compound to an energy source for a time and under conditions effective to cause said compound to emit light that at a wavelength between 700-1100 nm, and exhibits an integral emission oscillator strength that is greater than the emission oscillator strength manifest by either one of the said moieties individually.

180. The method of claim 172 wherein the covalently bound moieties that define the emissive species are linked by ethynyl, ethenyl, allenyl, butadiynyl, polyvinyl, thiophenyl, furanyl, pyrrolyl, or p-diethylylarenyl linkers or by a conjugated heterocycle that bears diethynyl, di(polyynynyl), divinyl, di(polyvinvyl), or di(thiophenyl) substituents.

181. The method of claim 172 wherein the polymeric material is a plurality of amphiphilic copolymers.

182. The method of claim 172 wherein the ancillary substituent on at least one of bound moieties comprising the emissive conjugated compound is alkyl, alkoxy, aryl, or ether.

183. The method of claim 172 wherein the ancillary substituent on at least one of bound moieties comprising the emissive conjugated compound is independently C_1-C_{20} alkyl, C_1-C_{20} alkoxy, -O-$(CH_2)_mCO_2R'$, -O(CH_2)-$(O(CH_2))_xR$or -O-$(CH_2)_pCROH$, where m and p are independently an integer from 1 to 10, x is an integer from 1 to 12, and R' is C_1-C_{20} alkyl or C_5-C_{20} aryl.

184. The method of claim 172 wherein the ancillary substituent on at least one of bound moieties comprising the emissive conjugated compound is aryl or substituted aryl.